

linear equalizers employed by the PCM modem system can be suitably optimized during a training procedure while the PCM modem system maintains an adequate reduction in baseline wander during data transmission. The training sequence preferably has an even spectrum that provides excitation to the linear equalizer at or near DC to better optimize the equalizer coefficients.

The present invention has been described above with reference to a preferred embodiment. However, those skilled in the art will recognize that changes and modifications may be made to the preferred embodiment without departing from the scope of the present invention. For example, the block diagram representations are used for illustrative purposes, and any practical realization of a PCM modem system will necessarily be more complex. In addition, the processes described herein may be embedded in a larger processing environment, and some of the process tasks set forth herein may be performed in a different order or eliminated in certain applications. These and other changes or modifications are intended to be included within the scope of the present invention, as expressed in the following claims.

What is claimed is:

1. A method for transmitting data in a pulse code modulation (PCM) modem system, said method comprising the steps of:

initializing a training mode characterized by a training interval;

adjusting spectral shaping in a transmit modem during at least a portion of said training interval to thereby reduce color in the spectrum of transmit signals, relative to signals transmitted by said transmit modem during a normal data mode, wherein said adjusting step comprises the step of decreasing the number of redundancy bits associated with said line coder;

transmitting a predetermined training sequence from said transmit modem during said training interval;

readjusting spectral shaping in said transmit modem to thereby increase color in the spectrum of signals transmitted after said training interval, relative to signals transmitted by said transmit modem during said training interval, wherein said readjusting step comprises the step of increasing the number of redundancy bits associated with said line coder; and

transmitting data symbols in accordance with a PCM protocol.

2. A method according to claim 1, further comprising the step of adaptively adjusting at least one equalizer located in a receive modem in response to said training sequence.

3. A method according to claim 1, wherein said training sequence is characterized by a substantially white spectrum over a predetermined bandwidth.

4. A training method for use with a pulse code modulation (PCM) modem system, said method comprising the steps of:

initializing a training mode for a PCM transmitter modem configured to transmit colored transmit signals during a data mode and a PCM receiver modem configured to receive and process said colored transmit signals during said data mode;

transmitting a predetermined training sequence from said PCM transmitter modem to said PCM receiver modem during said training mode, said training sequence having a less-colored spectrum, relative to said colored transmit signals, over a limited bandwidth, wherein the spectrum of said training sequence is characterized by a reduction in DC suppression relative to said transmit signal;

adaptively adjusting the transfer function of at least one equalizer resident at said PCM receiver modem during said training mode; and

switching said PCM transmit modem from said training mode to said data mode following said training mode.

5. A pulse code modulation (PCM) comprising:

means for shaping the spectrum of a PCM transmit signal, said means for shaping reducing spectral components near DC in said PCM transmit signal;

a logic circuit element configured to generate a predetermined training sequence having at least a first portion characterized by a substantially white spectrum over a predetermined bandwidth, wherein said predetermined training signal includes a second portion characterized by a colored spectrum over said predetermined bandwidth, relative to the spectrum of said first portion;

means for selecting an output from one of said means for shaping and said logic circuit element; wherein

said means for selecting selects output associated with said logic circuit element during a training mode; and said means for selecting selects output associated with said means for shaping during a data mode.

6. A PCM modem according to claim 5, wherein said means for shaping comprises a line coder.

7. A PCM modem according to claim 5, wherein said transmit signal exhibits spectral nulls near DC caused by said means for shaping.

8. A PCM modem according to claim 5, wherein said second portion is configured such that the spectrum of said second portion includes suppressed spectral components near DC.

9. A PCM modem according to claim 5, wherein said second portion is configured such that the spectrum of said second portion emulates the spectrum of an output signal from said means for shaping.

10. A training method for use with a pulse code modulation (PCM) modem system, said method comprising the steps of:

initializing a training mode for a PCM transmitter modem configured to transmit colored transmit signals during a data mode and a PCM receiver modem configured to receive and process said colored transmit signals during said data mode;

transmitting a predetermined training sequence from said PCM transmitter modem to said PCM receiver modem during said training mode, said training sequence having a less-colored spectrum, relative to said colored transmit signals, over a limited bandwidth, wherein said transmitting step comprises the steps of transmitting a first portion of said predetermined training sequence having relatively white spectral characteristics within said limited bandwidth and transmitting a second portion of said predetermined training sequence having relatively colored spectral characteristics within said limited bandwidth, said second portion being transmitted after said first portion;

adaptively adjusting the transfer function of at least one equalizer resident at said PCM receiver modem during said training mode; and

switching said PCM transmit modem from said training mode to said data mode following said training mode.

11. A method according to claim 10, wherein said second portion of said predetermined training sequence is configured to emulate the spectrum of said colored transmit signals.